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Superchilling of Atlantic cod from Greenland extent shelf-life to more than 32 days and MAP (40% CO_2 /60 % N_2) in combination with superchilling (-2 ^{O}C) prevent microbial spoilage

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Understanding of post-slaughter changes in seafood quality attributes facilitates the optimisation of distribution and storage logistics to prevent spoilage and product waste. Fishing grounds can influence the spoilage microbiota of fresh fish. In-depth studies of shelf-life and specific spoilage organisms are missing for cod (*Gadus morhua*) from Greenland.

Storage trails showed sensory shelf-life, based on QIM scores, of more than 32 days for fresh cod at -2^{O}C and of 16 days at 0^{O}C. The long shelf-life was supported by no observed increase of TVN, TMA nor pH during superchilled storage. At 0^{O}C the aerobic viable count reached 9.0 log CFU/g. With superchilling aerobic viable counts reached a similar level but grew very slowly. The spoilage microbiota was identified by 16S rRNA amplicon sequencing and shown to consist of *Pseudomonas* spp. 86%, *Psychrobacter* spp. 6% and *Shewanella* spp. 3%. The amplicon sequencing diversity corresponded to viable counting data obtained by using selective and indicative media for *Pseudomonas*, H_2S-producing *Shewanella* and *Photobacterium*. For cod in MAP (40% CO_2/60% N_2) at -2^{O}C the aerobic viable counts, determined on Long & Hammer agar, increased from 2.7 to 3.9 log CFU/g and this limited growth was due to slow growth of *Photobacterium* and *Shewanella*, which was supported by 16S rRNA amplicon data. The Bray-Curtis beta-diversity showed the smallest changes, from the start of the experiment, in microbial communities for cod stored in MAP at -2^{O}C (0.60) compared to cod at normal atmosphere at -2^{O}C (0.93) Eleven isolates from the spoilage microbiota (Day 32) were tested for spoilage potential and spoilage activity. For *Pseudomonas, Shewanella* and *Photobacterium* 2/3 of the isolates were capable of producing spoilage off-odours when grown in cod muscle blocks at 0^{O}C. The quantitative spoilage activity of these isolates will be evaluated during the summer of 2019 by studying their TVN and TMA formation.